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Chapter VIII

★

PORT FACILITIES

OF

BULGARIA

(JANIS No. 38)

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# Chapter VIII

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## PORT FACILITIES

### 80. General Description

#### A. Distinctive regional characteristics.

The Bulgarian coast is of moderate height, backed by mountains, and is easily accessible. The alluvial valleys and plains along the shore of the Gulf of Burgaz (Burgas)\* form a contrast to the rocky, and often eroded, cliffs of the coast. There are three large lagoons behind the sandy coast of the gulf. Although not subject to tidal influence, the water level in the Black Sea is subject to variations caused by barometric pressure and by wind. Along the coast south of Burgaz, it is reported that, with a moderate north-northeasterly gale, an unmistakable set of the current onto the coast and to the southward, is experienced, amounting at first to only one half knot but strengthening as the wind increases. With calms and light southerly winds, no current is experienced, indi-

cating that the currents are influenced by prevailing winds. If southeasterly and southerly winds have been blowing for three or four days, a set of about a half knot will be observed in a contrary direction.

Severe winters are succeeded by warm summers. In summer, a flow of air from the northwest carries the temperature conditions of south-central Europe over the greater part of the country.

Rainfall, although evenly distributed throughout the year, is heaviest in summer.

Fogs prevail in spring. In winter, with prolonged northeasterly winds, a thick haze occurs with a clear sky, making it difficult to distinguish the shore, even at short distances. From July to September, white fogs are most frequently experienced, although they occur occasionally during other months. These fogs come on at times with inconceivable rapidity in calm weather, enveloping everything with a thick white vapor through which nothing is visible. The mist occasionally rises and sometimes clears away entirely for a few moments, allowing the vessel's position to be established by navigational aids and landmarks along the coast.

There is a general tendency for cold winds to blow from the north during the winter months, but their effect is moderated in the south by the Stara-Planina (Balkan Mountains). Cyclonic depressions, which pass eastward along the Mediterranean low pressure belt, frequently cause southerly winds.

#### B. Major ports.

Bulgaria has only two seaports of any consequence (Figure VIII - 1):

PORT	CHARACTERISTICS
Burgaz.....	Artificial harbor. Principal port for overseas and coastal traffic. Reported to be a base for submarines.
Varna.....	Artificial harbor. Important commercial port. Anchorage suitable for a cruiser squadron and about four capital ships. Naval repair yard.

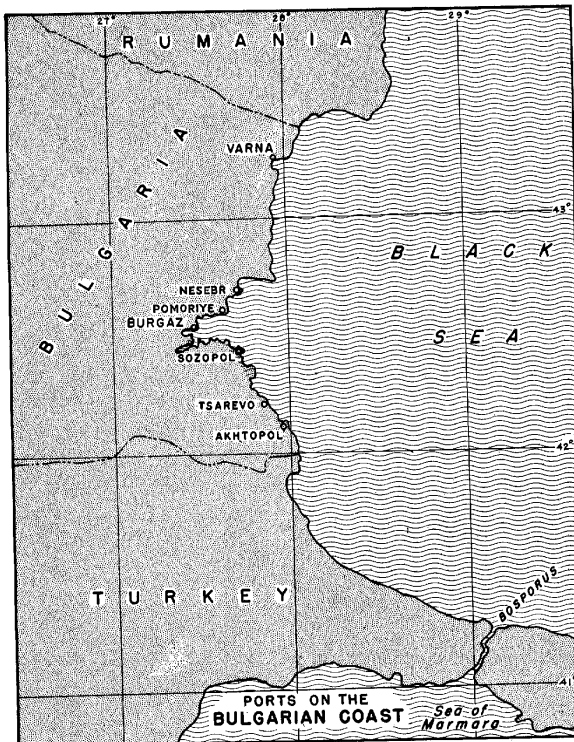
#### C. Minor ports.

There are three minor ports along the Bulgarian coast (Figure VIII - 1):

PORT	CHARACTERISTICS
Akhtopol (Agathopoli).....	Natural harbor, of little importance except as an anchorage.
Nesebr (Messemvria).....	Natural harbor, of little importance except as an anchorage.
Tsarevo (Vassiliko).....	Natural harbor, of little importance except as an anchorage.

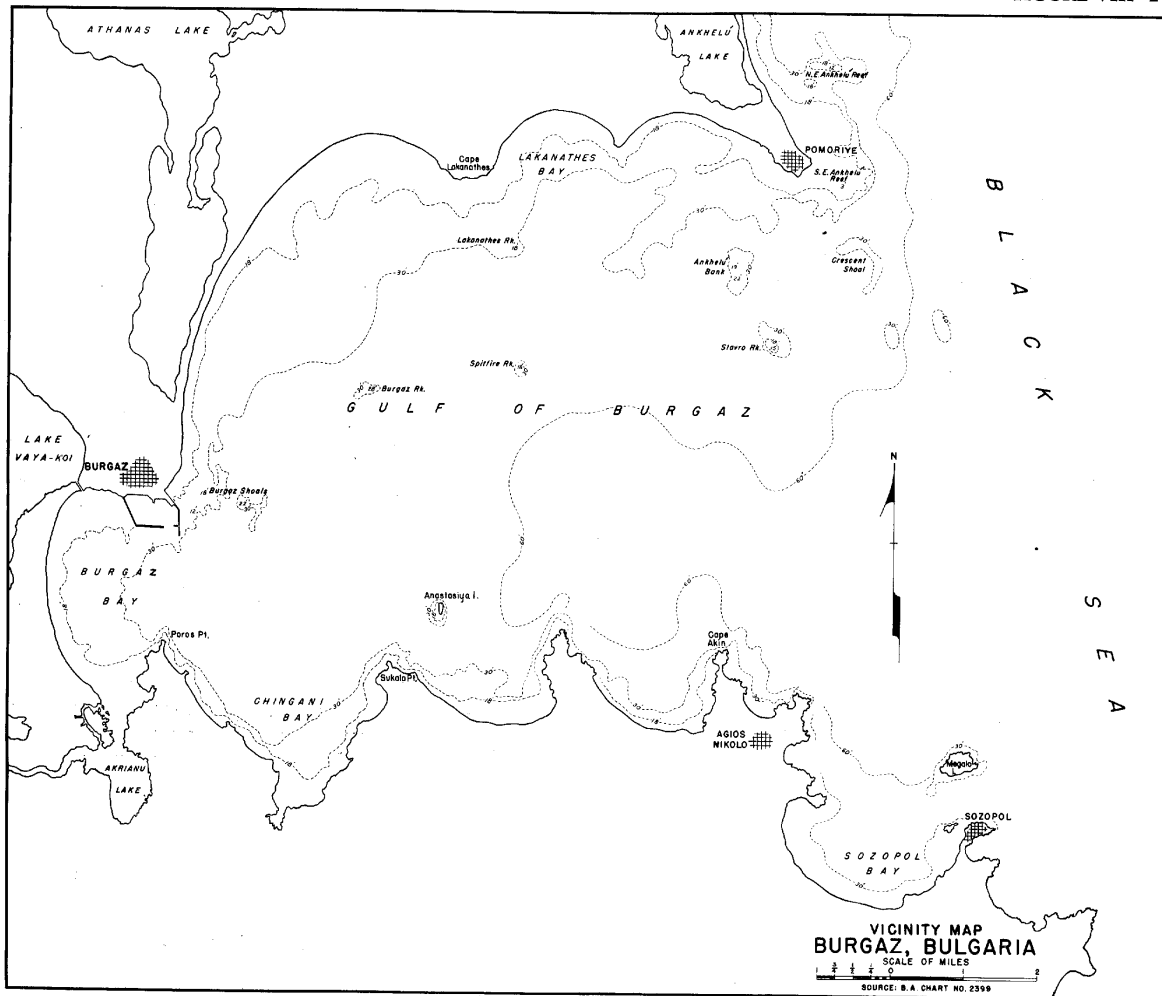
In addition, there are other small ports along the coast, including Pomoriye (Ankhelú) and Sozopol, at the northern and southern entrance points of the Gulf of Burgaz, respectively. All of these minor ports are unimportant, being frequented only by small coasting vessels, many of which are

FIGURE VIII - 1



\*See Appendix I for spellings of all features. The following spellings of features as used in this Chapter differ slightly from those on G.S., G.S. maps, Series 4072 and 4088: Bebrezh, Bozhurishte, Canara (Kana-Gol), Carasuum, Cherni Iskr, Chiporovtsi, Devna, Dobrich (Bazargio), Dobrinishta, Dubovo, Ellidere, Emine (town), Ghiaur Suiuciuc (Chiaur Suiuciuc), Gorna Dzhumaya, Gorna Orekhovitsa (Gln.-Orekhovitsa), Gulubovo (Gara-Glebovo), Kazanlk, Kharmanli, Koprivshitsa, Kuri Burnu, Ladzhene (Lzhene), Musala, Panagyurishte, Paphia (Mt.), Peinirdzhik, Perushtitsa, Peshtera, Piraievs, Pirdop (Pirdol), Polikraishte, Rakovets, Resen (Pesen), Sofiya, Sredets, Stizharov, Surnena Gora (Srneha Gora), Svishtov, Syuyutliika, and Trgovishte.

FIGURE VIII - 2



sailing craft averaging less than 200 tons. The total amount of cargo loaded and discharged at these ports in 1920 represented less than five per cent of the total traffic of Bulgarian Black Sea ports.

## 81. Major Ports—Burgaz

### A. Harbor.

(1) *Location.* Burgaz ( $42^{\circ} 29' N$ ,  $27^{\circ} 29' E$ ), on the west coast of the Black Sea, is on the north side of the Bay of Burgaz, at the head of the Gulf of Burgaz, and is 120 statute miles northwest of the Bosphorus (Figures VIII - 1 and VIII - 2).

#### (2) Type of harbor and nature of port.

(a) *Depth.* A depth of  $23\frac{1}{2}$  feet has been dredged in the eastern part of the harbor. In the western part the general depths range from 20 to 9 feet. Two buoys with red spherical top marks are moored on the western side of the dredged area.

(b) *Size.* The total water area of the harbor is 163 acres, of which 87 acres has been dredged to  $23\frac{1}{2}$  feet.

(c) *Protection, character of coast.* The harbor is artificial, and is protected by two breakwaters. The shore of the bay trends westward about 1,200 yards and then southward. The town is on high land, but the shore along the head of the bay to the west of the town is low, sandy, and covered with reeds. This low shore separates the bay from a salt-water lake, Lake Vaya-Koi (Burgaz Liman or Muris Geul), which is about five miles long from east to west and two miles wide. At a point 1,200 yards west of the harbor, the beach between the bay and the lake is only about 200 yards across, and is cut by a narrow canal. The coast northward from Burgaz forms a large bight, with several rocks and shoals offshore. A second salt-water lake is separated from the bight by a narrow strip of beach about two miles long and 200 yards across.

(d) *Customary Use.* Burgaz is a port of call for steamers, which can come alongside the quay in the northeast part of the harbor. It is reportedly used as a submarine base.

(e) *Breakwaters.* In the west part of the town a breakwater commences at Orchard Point, extending south-south-

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east for 2,340 feet, then east for about 2,250 feet. The East Breakwater extends from the eastern end of the town in a south-east and then south direction for a total distance of 3,660 feet. A short arm extends from the East toward the West Breakwater, leaving a passage for entrance about 640 feet wide. The inner side of the East Breakwater is quayed near its root, the quayage extending westward for some distance along the north side of the harbor. The quay available to ships has a total length of about 1,960 feet, with a depth of  $23\frac{1}{2}$  feet alongside. There are hauling-off buoys in the northeast part of the harbor. Two mooring buoys used by the Socony-Vacuum Oil Company's vessels are located about 200 yards apart in the south part of the harbor. Tankers berth stern to the outer end of the West Breakwater, where there are depths of  $23\frac{1}{2}$  feet.

(3) *Entrance channel.* The approach to the harbor through the Bay of Burgaz has depths of 39 to 27 feet. A depth of 23 feet is available in the channel through the harbor entrance, at which point the channel is about 450 feet wide.

In 1941 there were three lights at the harbor entrance. At the head of the East Breakwater a flashing white light, 56 feet above high water and visible ten miles, shown from a white cylindrical tower, 28 feet high; the light was obscured from  $153^{\circ}$  to  $253^{\circ}$ . There was a fog siren at the light. At the head of the short arm extending west from the East Breakwater a fixed green light, 33 feet above high water and visible two miles, shown from a white cylindrical iron tower, 22 feet high; the light was obscured from  $333^{\circ}$  to  $213^{\circ}$ . At the head of the West Breakwater a fixed red light, 33 feet above high water and visible two miles, shown from a white cylindrical iron tower, 22 feet high.

(4) *Anchorage.*

(a) *Inner harbor.* The eastern part of the harbor is roughly only 600 yards in diameter within the dredged area, and to facilitate moving vessels anchorage is usually taken by ships outside the harbor. In the western part of the harbor, depths of 20 to 18 feet are available for small vessels within a space about 40 acres in area.

(b) *Outer harbor.* Vessels of deep draft lie at anchor south-east of the port entrance in a depth of six to six and one-half fathoms, over mud bottom. Burgaz Bay is open to the eastward, and winds from that quarter cause a heavy swell; with strong easterly winds it is necessary to take shelter in the bays to the southward.

(5) *Significant hydrographic features.* There are no tides, the level of the water being influenced by barometric pressure, the winds and seasons. The direction of the currents is influenced by the winds.

(6) *Local weather.* Records indicate that the average annual temperature at Burgaz is  $54.7^{\circ}$ , ranging from a mean minimum of  $28.6^{\circ}$  in January to a mean maximum of  $83.5^{\circ}$  in August (see Chapter IV). The highest temperature recorded is  $106^{\circ}$  (in July) and the lowest  $1^{\circ}$  (in January). Average annual rainfall is 23 inches, evenly distributed and with greatest monthly amounts in June. Mean wind velocities range from 3.8 miles per hour in May to 6.0 in December and January. The highest percentage of observations is from the east from March through October and from the west in the remaining months. Local prevailing winds are northwest breezes rising about midnight and freshening until daylight when the direction changes through northeast to southeast; during the day the

direction changes through southwest to northwest and the velocities decrease.

B. Landing facilities.

(1) *Piers, wharves and quays.*

(a) *Capacity.* There are berths for about five moderate-sized vessels at the 1,960-foot quay in the northeast part of the harbor, which has a depth of  $23\frac{1}{2}$  feet alongside (Illustration VIII - 1 and Figure VIII - 3). An additional quay has been constructed for the use of fishing vessels and small craft. This latter quay, believed to be an extension westward of the main quay, is about 655 feet long and has a depth of  $14\frac{1}{2}$  feet alongside. The Socony-Vacuum Oil Company has a tanker

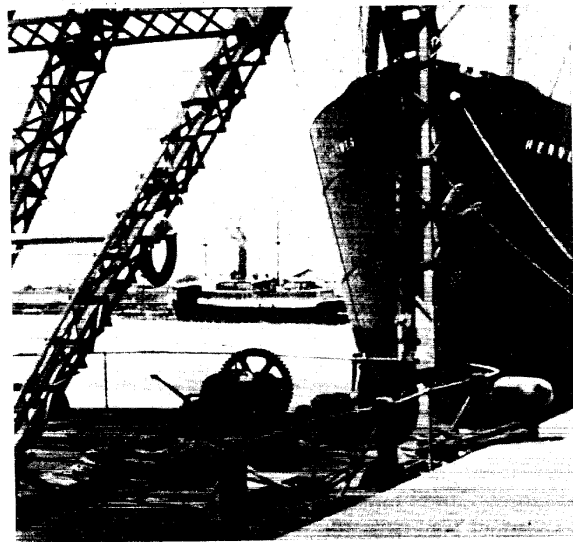


Illustration VIII - 1. Burgaz.  
Floating crane and vessel at main quay (No. 1 on Figure VIII - 3).

berth near the head of the West Breakwater, on the south side of the harbor. Vessels moor stern to the breakwater; two mooring buoys about 150 feet off the breakwater and 200 yards apart are available. One six-inch gasoline and two eight-inch oil pipelines are on the breakwater with a floating pipeline extending to the mooring buoys. Rail sidings and transit sheds are available. Vessels usually discharge by ship's gear into railway cars and trucks.

(b) *Description.* Details of the wharves are shown in Table VIII - 1.

(2) *Other cranes.* There is a floating crane of 40 tons capacity which is sometimes moved to Varna (see Illustration V - 9).

(3) *Warehouses, storage facilities and supply dumps.*

(a) *Grain elevators.* The facilities for storing grain were reported in 1930 to include three grain warehouses. One of these, of timber construction, has floor space of about 37,000 square feet; further details are lacking. No data are available concerning grain-handling equipment or rate of handling. There are three berths for grain steamers.

(b) *Storage warehouses.* There are reported to be 12 sheds at the port, believed to include transit sheds, grain ware-

TABLE VIII - 1  
BURGAZ; PIERS, WHARVES, AND QUAYS

Reference Number on Figure VIII-3.....	1	2	3
Name.....	Main Quay	Main Quay Extension	Socony Bulk Oil Berth
Location on water front.....	NE corner of harbor	N side of harbor	150 ft. off W Breakwater, S side of harbor
Owned by.....	Bulgarian Port Administration	Bulgarian Port Administration	Bulgarian Port Administration
Operated by.....	Bulgarian Port Administration	Bulgarian Port Administration	Socony-Vacuum Oil Co., Inc.
Purpose for which used.....	Handling general cargo	Handling general cargo by coastal vessels	Receipt of petroleum products
Type of construction.....	No data available	No data available	Tanker berth with 2 buoys
Description:	FACE (FEET)	FACE (FEET)	FACE (FEET)
Dimensions (west to east).....	200+900+1,060+165	555+100+60	—
Depth of water.....	23½	14½	23½
Berthing space available.....	1,060 + 900	555+100	1 berth
Width of apron.....	Open wharf	Open wharf	—
Capacity per sq. ft. (lbs.).....	Unlimited	Unlimited	—
Lighted or unlighted.....	Lighted	Lighted	Unlighted
Transit sheds.....	See: (3) (b), Warehouses, storage facilities, supply dumps	None	None
Mechanical handling facilities.....	1 10-ton traveling crane; 1 electric overhead traveling 5-ton crane	None	None
Railway connections.....	2 tracks on 1,060-ft. section; total length 2,000 ft.; 1 890-ft. track on 900-ft. section	Tracks in rear of quay	None
Estimated capacity for handling general cargo at berths in short tons per eight-hour day.....	2,000	250	—

houses and storage warehouses. Two storage warehouses and a customs warehouse, believed to be located in the rear of the Main Quay (Reference No. 1 on Figure VIII - 3), have a floor space of about 22,500 square feet each. A cold storage warehouse, with an area of 1,800 square feet, has been built in the west part of the port; the exact location is not known. Railway sidings are available at the warehouses.

(c) *Supply dumps.* There is reported to be an open storage space of five and one-quarter acres available at the port. This area is believed to be adjacent to the East Breakwater, in the rear of the 1,060-foot section of the Main Quay (Reference No. 1 on Figure VIII - 3), where there are two railroad sidings.

(4) *Other landing places.* There is a pier about 250 feet long and 30 feet wide shown on the chart (B.A. 2399) near a slaughterhouse, westward about 700 yards from the root of the West Breakwater. The charted depth at the pierhead is four feet.

(5) *Harbor craft.* No data available.

(6) *Clearing facilities.*

(a) *Railroads.* There is a standard-gauge railroad line from Burgaz leading inland to Plovdiv. This is one of the important railroad arteries through Bulgaria. A local standard-gauge line serves an area north of Burgaz in which there are lignite mines. This area is also served by a narrow-gauge 60-centimeter (1 foot, 11½ inches) line, 12 miles long, which may no longer be in use. There is a small railroad yard in the northwest part of the harbor. The railroad lines serving the port are all single-tracked.

(b) *Highways.* A main trunk road connects Burgaz with Sofiya (Sofia). The surfacing is either water-bound macadam

or gravel. From this main trunk road, a main road follows a circuitous route to Varna and another main road parallels the coast directly between Varna and Burgaz. Two main roads extend south and southwest to the Turkish border (see Plan VII - 2). Local third-class roads from Burgaz serve the area bordering the coast to the southward and northward.

(7) *Labor.* No data available.

(8) *Capacity.*

(a) *Annual traffic.* In pre-war years imports and exports via Burgaz totaled an average of approximately 90,000 and 158,000 short tons respectively; the number of ships entering the port was 3,838. The cargo discharged was 145,639 short tons, and the cargo loaded was 188,562 short tons. The most important commodities exported in 1938 are shown in Table VIII - 2.

TABLE VIII - 2  
BURGAZ, PRINCIPAL EXPORTS, 1938

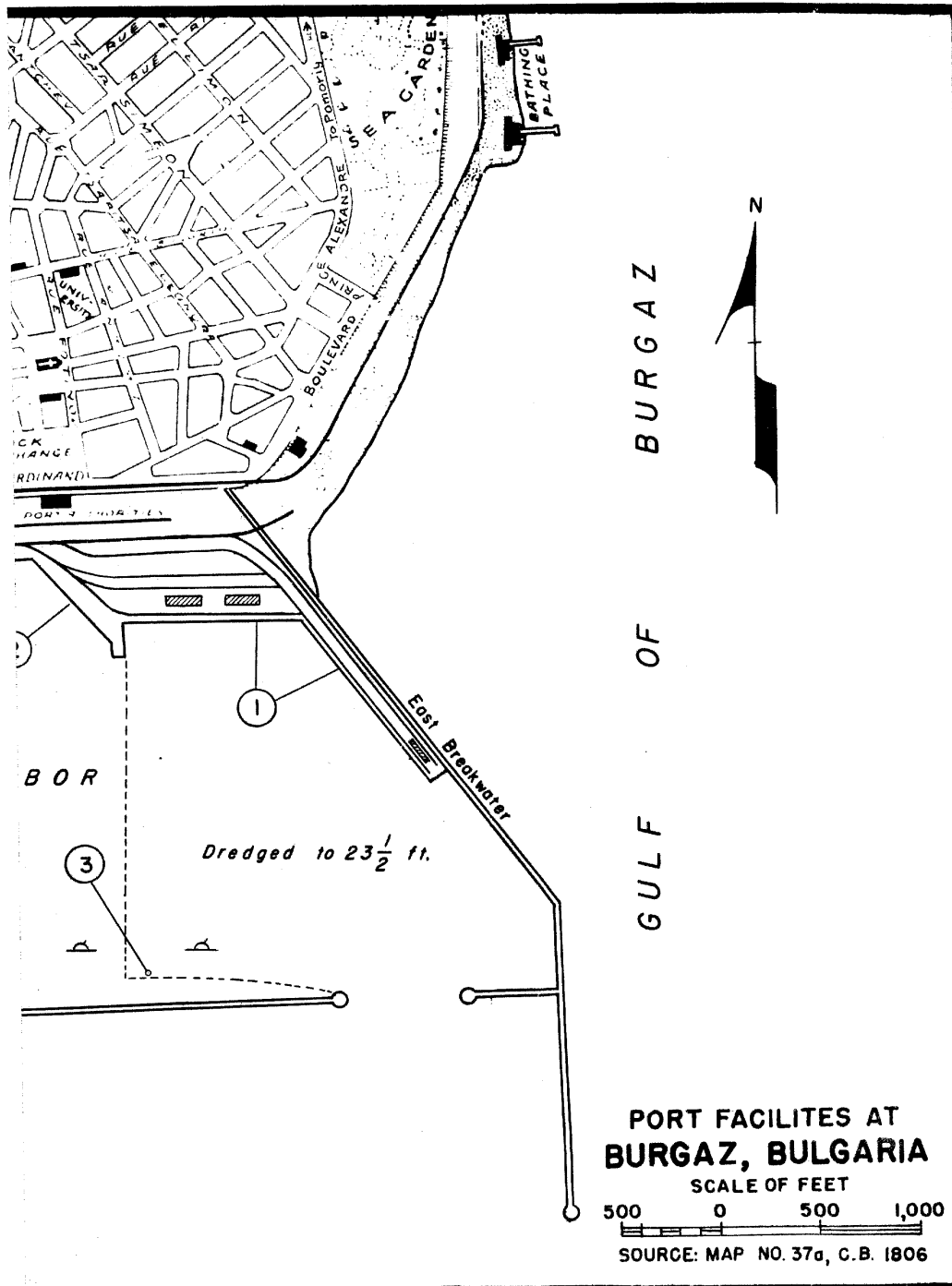
	SHORT TONS (2,000 LBS.)
Grain.....	35,470
Wheat flour.....	400
Bran.....	9,700
Vetches and beans.....	2,515
Cheese.....	1,075
Fruit, fresh and preserved.....	10,575
Grape pulp.....	2,430
Sunflower and other seeds.....	3,950
Nuts.....	160
Hides.....	160
Oil cake and oil seed waste.....	29,720
Charcoal.....	3,780
Tobacco.....	23,080



FIGURE VIII - 3

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(b) *Unloading.* The estimated unloading capacity of the port, exclusive of lighterage operations, is 2,250 short tons per day.

(c) *Clearance.* Insufficient data available.

#### C. Availability of supplies.

(1) *Water.* Fresh water is piped to the Main Quay (Reference No. 1 in Figure VIII - 3). The rate at which water can be supplied is not known. The water has no odor, no unpleasant taste and is described as of excellent quality.

#### (2) Oil and gasoline.

(a) *Bunkering capacity.* Vessels may be bunkered at the Socony Bulk Oil Berth (Reference No. 3 in Figure VIII - 3), where there is an eight-inch line capable of handling about 700 barrels per hour.

(b) *Storage capacity.* The Socony-Vacuum Oil Company bulk installation consists of one gasoline tank with a capacity of 8,700 barrels, one gas oil tank with a capacity of 36,300 barrels, and two refined oil tanks with a total capacity of 62,900 barrels. It is believed that additional facilities have been constructed.

(c) *Stocks.* The stocks on hand are not known. A limited supply of fuel oil is normally maintained.

#### (3) Coal.

(a) *Bunkering capacity.* Vessels may be bunkered alongside the Main Quay (No. 1 in Figure VIII - 3).

(b) *Delivery rate.* The maximum rate of bunkering is 400 tons per day.

(c) *Stocks.* A small amount of inferior-quality Bulgarian coal is normally available; it has been found satisfactory if mixed with better quality coal.

#### D. Repair facilities.

(1) *Dry docks.* There are no dry docks.

(2) *Marine railways.* No data available.

(3) *Marine repair plants.* Minor repairs may be made by a local concern, or at the repair workshop of the State Railway Administration.

#### E. Vulnerability.

Vulnerable objects are: the railroad station, yard and trackage along the waterfront; a highway bridge and a bridge carrying a railroad spur which cross the canal connecting the salt-water Lake Vaya-Koi (Burgaz Liman) with Burgaz Bay; and the pumping station of the water supply system, located five and one-quarter miles north of the town.

#### F. Recent changes.

A small shipyard is reported to have been constructed at the port. No details are available.

### 81. Major Ports (Concluded)—Varna

#### A. Harbor.

(1) *Location.* Varna (43° 12' N, 27° 55' E) is on the west coast of the Black Sea, at the head of Varna Bay, and about 150 statute miles north-northwest of the Bosphorus (Figure VIII - 1 and VIII - 4).

#### (2) Type of harbor and nature of port.

(a) *Depth.* The inner harbor has been dredged to 25 feet and this depth is available alongside all quays. In the outer harbor there are depths of 31 to 24 feet.

(b) *Size.* The inner harbor has a total water area of 116 acres, and in its main part is roughly rectangular in shape, with approximate dimensions for this part of 800 by 530 yards (Illustration VIII - 2).

(c) *Protection and character of coast.* The harbor is naturally protected by the land from west to north, and artificially protected by breakwaters on the south and east sides. The coast northeastward for about one mile is a sandy bathing beach bordered in places by rocks and intersected by the mouths of two small canals. (Illustration VIII - 3.) Continuing eastward for about two miles, the shore is backed by a steep bluff rising from 60 feet at the western end to 130 feet in height at the eastern end. The shore southward of Varna is a sandy beach for about one and one-quarter miles; trending eastward it is bordered by rocks and backed by steep slopes. The waters along the sandy beach are shallow, the six-foot line running about 125 yards offshore.

(d) *Customary use.* Varna is an important port, serving the northern half of Bulgaria. It is the eastern terminus of the Varna/Ruse (Ruschuk) Railroad, which has a connection to Sofiya, and is a port of call for steamships.

(e) *Arrangement.* The port comprises: an inner harbor; an outer harbor adjacent on the south; Devna (Devno) Canal, about one and one-quarter miles long, extending west-northwest from the outer harbor to Lake Devna, a large salt-water lake west of Varna; two industrial basins excavated on the north side of Devna Canal; and the eastern end of Lake Devna. The densely-occupied part of the town extends northward from the inner harbor. The canal is flanked on both sides by industrial zones. There is a navy yard in the southwest corner of the inner harbor, extending southward to the northern bank of the Devna canal, where there is a seaplane base.

The railroad line enters the town from the northwest, along the north shore of Lake Devna, and runs along the north side of the inner harbor. A branch line serves the industrial zone on the south side of the Devna Canal.

At the southeast corner of the town, the outer breakwater extends in a southerly direction along the east side of the inner and outer harbors for about 930 yards, having a short arm 110 yards long on its western side 450 yards from its seaward end and abreast the southern breakwater. The southern breakwater, starting from the western shore, runs in an easterly direction for about 430 yards, leaving an entrance to the inner harbor which is 220 yards wide between the extremity of the southern breakwater and the end of the spur from the outer breakwater. (Illustration VIII - 4.)

Devna Canal opens on the west side of the outer harbor. The canal entrance is protected on the south by a mole about 325 yards long, which is reported to extend under water an additional 300 yards. The outer harbor is between this mole on the southwest, the southern breakwater on the north and on the east the outer breakwater.

The present depths available in the Devna Canal and in the two industrial basins or docks excavated on its north side are uncertain. The Devna Canal was originally dredged to a width of from 150 to 180 feet and a depth of 16 feet, but it is believed that subsequent dredging of the channel has taken place. A depth of 26 feet is reported to have been recently dredged,



*Illustration VIII - 2. Varna Harbor.*  
Lake Devna and canal in background. Naval base at extreme left. (About 1931.)



*Illustration VIII - 3. Varna.*  
Landing pier at bathing beach north of harbor.

*Continued*

## PORT FACILITIES

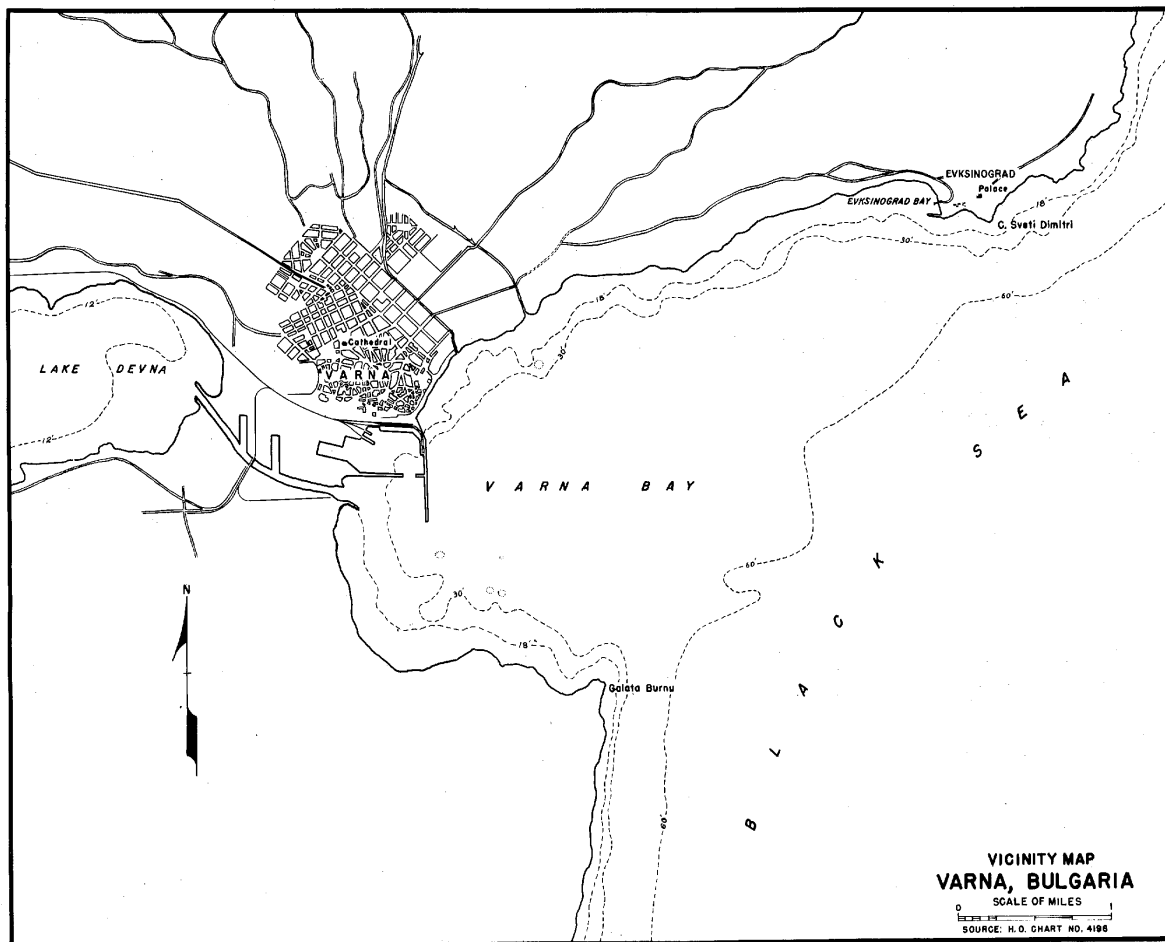
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but this has not been confirmed. The two basins on the canal, known as Dock Nos. 1 and 2, are believed to be dredged to the same depth as the canal. Dock No. 1, the easternmost basin, is about 1,150 feet long and 245 feet wide. Dock No. 2 was reported in June, 1943, to be still under construction, but appeared at that time to be nearing completion, and to be of the same ultimate dimensions as Dock No. 1.

Lake Devna is about six and one-quarter miles in length in an east-west direction, with a width varying from one-

lights. At the south end of the outer breakwater a flashing white light, 48 feet above high water and visible ten miles, shown from a white cylindrical iron tower, 28 feet high; a nautophone fog signal sounded at the light. At the entrance to the inner harbor two lights shown. At the west entrance point a fixed red light, 33 feet above high water and visible two miles, shown from a white cylindrical iron tower, 21 feet high, at the head of the southern breakwater. At the east entrance point a fixed green light, 33 feet above high water

FIGURE VIII - 4



half mile to one and one-quarter miles. It has general depths varying from seven to ten fathoms. The dredging program undertaken in connection with the Devna Canal is believed to have included a channel communicating with deep water in Lake Devna, together with dredging for a short distance along the east shore of the lake, northward of the Devna Canal. The charted depths in this latter area are less than six feet. There is a small shipyard with workshops located along this shore, and a small floating dry dock is moored offshore.

(3) *Entrance channel.* The approach to the outer harbor, which is entered from the south, has a least depth of 30 feet, and this depth is available through the entrance to the inner harbor for its full width of 220 yards. In 1942 there were three

and visible two miles, shown from a white cylindrical iron tower, 21 feet high, at the head of the arm from the eastern breakwater. (Illustrations VIII - 2 and VIII - 4.)

The Devna Canal is crossed near its mid-point by a combination railroad and highway drawbridge constructed to replace two highway bridges. The drawbridge is of steel construction, 210 feet long and 38 feet wide, with three spans. The middle span is lifted by electric power, and has a horizontal clearance of 60 feet. It is not known whether the span is of the vertical lift, or bascule type.

(4) *Anchorage.*

(a) *Inner harbor.* There is no anchorage available for large vessels within the inner harbor, except that about 12 vessels

can moor stern to or bow on to the breakwaters. The harbor bottom is soft mud. There are two mooring buoys in the northern part of the inner harbor, used for warping vessels. A large number of vessels can be anchored in Lake Devna, but there is little quayside.

(b) *Outer harbor.* The best anchorage is in Varna Bay, eastward of the outer breakwater. It is classified as a "C" anchorage, is suitable for a cruiser squadron and about four capital ships, and is one of the safest anchorages in the Black

annual rainfall is 20.3 inches, evenly distributed and with greatest monthly amounts in June. Mean wind velocities range from 2.3 miles per hour in June to 3.4 in January. The highest percentage of observations is from the west and northwest from October through January, from the east from February through May and calms from June through September. Strong southeast winds occur in June and September. Winter northeast winds are cold and northwest winds are attended by moist weather and fog.



Illustration VIII - 4. Varna.  
View of inner harbor, looking west-southwest, outer harbor at left.

Sea. The bay is open to winds between east and southeast, which send in a swell. There are depths of nine to ten fathoms in the approach and six to eight fathoms in the anchorage, over mud bottom. Fishing nets are occasionally laid out eastward of the breakwater a distance of 300 yards. The royal palace at Evksinograd (Euxinograd), about four miles east-northeast of Varna, is a conspicuous landmark. The most conspicuous building at Varna is the Bulgarian cathedral, which has six cupolas.

(5) *Significant hydrographic features.* There are no tides, the level of the water being influenced by barometric pressure, the winds and seasons. The direction of the current is influenced by the winds.

(6) *Local weather.* Records indicate that the average annual temperature at Varna is 54.3°, ranging from a mean minimum of 27.3° in January to a mean maximum of 83.3° in August (see Chapter IV). The highest temperature recorded is 106° (in July) and the lowest -3° (in January). Average

## B. Landing facilities.

### (1) *Piers, wharves, and quays.*

(a) *Capacity.* In the northeast corner of the inner harbor are the principal quays and the warehouses. (Nos. 1, 2 and 3 on Figure VIII - 5 and Illustration VIII - 5.) The quayside extends along part of the inner side of the outer breakwater, continuing in a northwest and west direction along the north side of the harbor; the total berthing space is 2,295 feet, with a depth of 25 feet alongside. Railroad sidings flush with the dock and having a total length of about 3,350 feet are available at quayside.

In the northwest corner of the inner harbor are two piers, operated by the Bulgarian Railway Administration, which are 590 and 245 feet long, and have a depth of 23 feet alongside. Railroad tracks extend along both piers. The remaining waterfront along the west side of the inner harbor has been developed within recent years, and the present status of the improvements made is not known in detail. Dredging of a

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## PORT FACILITIES

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basin is reported to have been completed in 1927, and two quays appear to have been since constructed, adjacent on the west to the railway piers. These quays are 627 and 430 feet long, and are believed to have a minimum depth of 25 feet alongside. It is not known whether the dredged basin has been quayed around its full perimeter, since it is reported that there are small broadside marine railways located in the basin, operated by the naval authorities in connection with the naval yard adjacent to the east.

The waterfront of the naval yard, in the southwest corner

On the north side of the Devna Canal, Docks No. 1 and 2, serving the adjacent industrial areas, each has a total quayage of about 2,500 feet. Dock No. 2, while reported in June, 1943 to be under construction, is believed to have been since completed. The depths available in the two docks are not known, but believed to be the same as the Devna Canal, which has been dredged to 26 feet, according to an unconfirmed report. Close southward of the sea entrance of the Devna Canal are some oil storage tanks, and according to data dated June, 1943, dredging has been in progress for bringing tankers close



Illustration VIII - 5. Varna.

View of harbor, looking south-southwest, North Quay (No. 3 on Figure VIII - 5) in foreground.

of the inner harbor, is likewise occupied in part by a small broadside marine railway, and it is not known how much quayage is available for berthing. The South Breakwater, extending east for about 430 yards from the navy yard, has berthage alongside for three vessels, and is believed to be quayed on the inner side. It is reported that ships usually moor stern to the breakwater, which has a depth of 25 feet alongside.

inshore. Depths of dredging are not known, nor are details of pipelines and wharfage facilities available.

(b) *Description.* The available details of the wharves at the port are shown in Table VIII - 3. The estimates of cargo which can be handled per month at each of the wharves are based upon the handling of general cargo at berths. An eight-hour day is assumed.

TABLE VIII - 3  
VARNA; PIERS, WHARVES, AND QUAYS

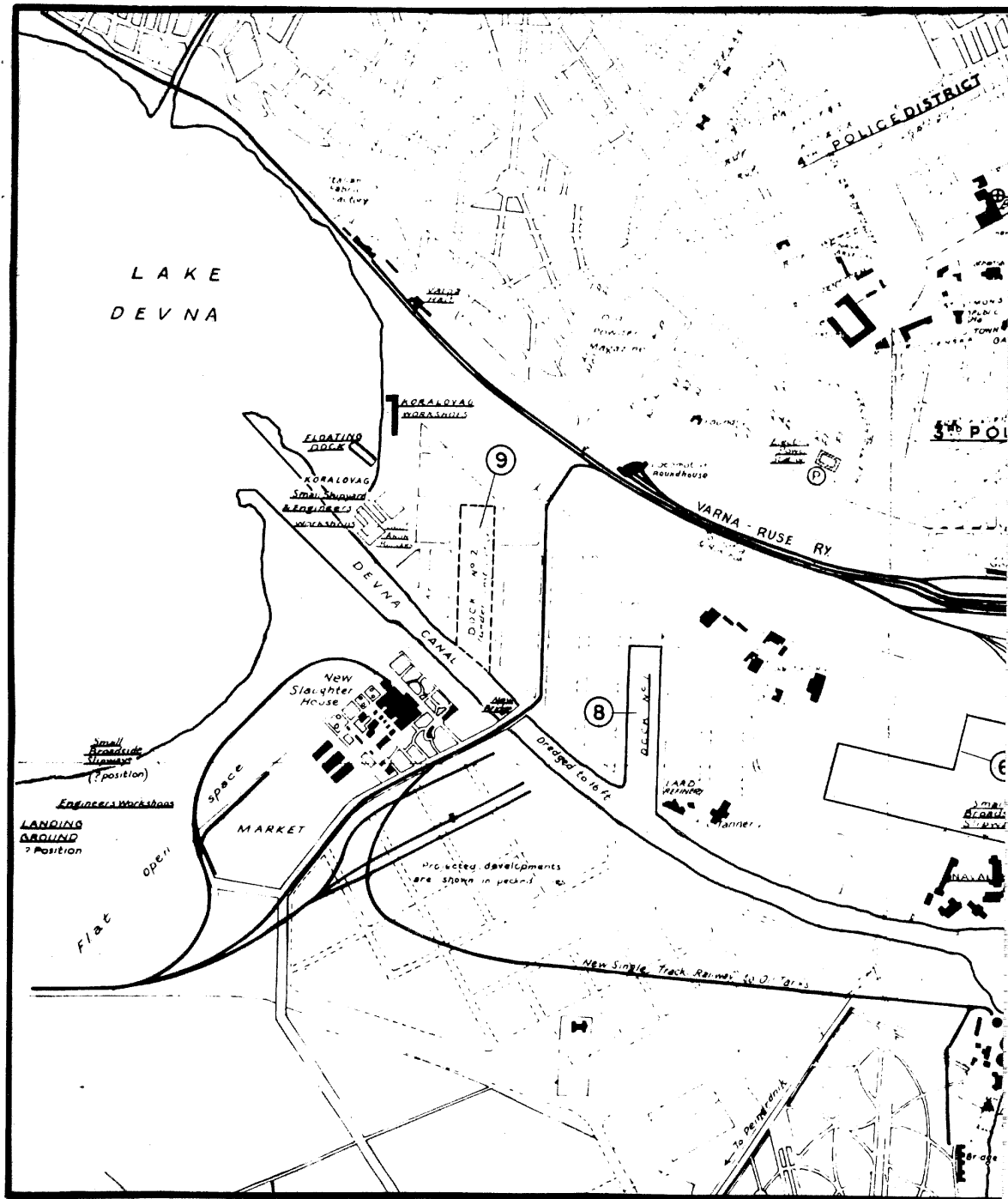
Reference Number on Figure VIII - 5	1	2	3
Name	East Quay (Illustration VIII - 2)	Northeast Quay (Illustration VIII - 2)	North Quay (Illustration VIII - 5)
Location on water front	E side of harbor	NE corner of harbor	N side of harbor
Owned by	Bulgarian Port Administration	Bulgarian Port Administration	Bulgarian Port Administration
Operated by	Bulgarian Port Administration	Bulgarian Port Administration	Bulgarian Port Administration
Purpose for which used	Handling general cargo	Handling general cargo	Handling general cargo
Type of construction	Masonry and concrete blocks, solid fill	Masonry and concrete blocks, solid fill	Masonry and concrete blocks, solid fill

## PORT FACILITIES

~~CONFIDENTIAL~~TABLE VIII - 3—(Continued)  
VARNA; PIERS, WHARVES, AND QUAYS

	1 (cont'd)	2 (cont'd)	3 (cont'd)
	FACE (FEET)	FACE (FEET)	FACE (FEET)
Description:			
Dimensions.....	170 x 660	420	1,215
Depth of water.....	25	25	25
Berthing space available.....	660	420	1,215
Width of apron.....	Open wharf	74	35
Capacity per sq. ft. (lbs.).....	Unlimited	Unlimited	Unlimited
Lighted or unlighted.....	Lighted	Lighted	Lighted
Transit sheds.....	None	See: B (1), Warehouses, storage facilities, supply dumps	See: B (1), Warehouses, storage facilities, supply dumps
Mechanical handling facilities.....	1 12-ton hand crane, mounted on railway truck	None	See Ref. No. 1
Railway connections.....	4 tracks, total length 2,600 ft.	None	1750-ft. track; additional track-age in rear of sheds
Estimated capacity for handling general cargo at berths in short tons per eight-hour day..	450	300	1,000
Remarks.....	Parapet wall along outer side of E breakwater	—	—
Reference Number on Figure VIII - 5	4	5	6
Name.....	North Railway Pier	South Railway Pier	Quay
Location on water front.....	NW corner of harbor	NW corner of harbor	W side of harbor, adjacent to railway piers
Owned by.....	Bulgarian Port Administration	Bulgarian Port Administration	Bulgarian Port Administration
Operated by.....	State Railway Administration	State Railway Administration	Bulgarian Port Administration
Purpose for which used.....	Handling general cargo	Handling general cargo	Handling general cargo
Type of construction.....	No data available	No data available	Believed to be masonry and concrete blocks, solid fill
	FACE (FEET) N SIDE (FEET) S SIDE (FEET)	FACE (FEET) N SIDE (FEET) S SIDE (FEET)	FACE (FEET)
Description:			
Dimensions.....	60 245 245	60 590 590	627 x 430
Depth of water.....	23 23 23	23 23 23	25
Berthing space available.....	— 245 See "Remarks"	— 590 See "Remarks"	627 x 430
Width of apron.....	Open wharf	Open Wharf	Open wharf
Capacity per sq. ft. (lbs.).....	No data	No data	Unlimited
Lighted or unlighted.....	No data	No data	No data
Transit sheds.....	None	None	None
Mechanical handling facilities.....	See Ref. No. 1	See Ref. No. 1	None
Railway connections.....	1 235-ft. track	1 580-ft. track	None
Estimated capacity for handling general cargo at berths in short tons per eight-hour day..	160	350	700
Remarks.....	Slip 90 ft. wide between N and S railway piers	Slip 90 ft. wide between N and S railway piers	Completion of this quay not definitely determined
Reference Number on Figure VIII - 5	7	8	9
Name.....	Southern Breakwater (Illustration VIII - 2 and VIII - 4)	Dock No. 1	Dock No. 2
Location on water front.....	S side of harbor	N side of Devna Canal	N side of Devna Canal
Owned by.....	Bulgarian Port Administration	Bulgarian Port Administration	Bulgarian Port Administration
Operated by.....	Bulgarian Port Administration	Bulgarian Port Administration	Bulgarian Port Administration
Purpose for which used.....	Mooring vessels stern-to	Handling industrial cargo	Handling industrial cargo
Type of construction.....	No data available	No data available	No data available
	FACE (FEET)	FACE (FEET)	FACE (FEET)
Description:			
Dimensions.....	1,290	1,230 x 245 x 1,025	1,230 x 245 x 1,025
Depth of water.....	25	No data	No data
Berthing space available.....	1,200	1,230 x 245 x 1,025	1,230 x 245 x 1,025
Width of apron.....	30	Marginal street	Marginal street
Capacity per sq. ft. (lbs.).....	Unlimited	Unlimited	Unlimited
Lighted or unlighted.....	Lighted	No data	No data
Transit sheds.....	None	None	None
Mechanical handling facilities.....	None	None	None
Railway connections.....	None	None	None
Estimated capacity for handling general cargo at berths in short tons per eight-hour day..	—	—	—
Remarks.....	Believed used by tankers and furnished with pipeline to naval oil tanks on S side of Devna Canal entrance	—	Still under construction as per report of June, 1943







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(2) *Other cranes.* A steam floating crane is usually in the port, but is sometimes moved to Burgaz (see Illustration V - 9). There are reported to be cranes on the quay of the navy yard in the southwest corner of the inner harbor, but their capacities are unknown.

(3) *Warehouses, storage facilities and supply dumps.*

(a) *Grain elevators.* Grain is handled at the port both in bags and in bulk. It is probably stored in warehouses as no special grain elevators are available. The quay on the west side of the harbor (No. 6 on Figure VIII - 5) was designed to accommodate grain steamers, it being intended to provide a grain silo and elevating equipment on the upland.

(b) *Storage warehouses.* There are four sheds at the North-east Quay and North Quay (Nos. 2 and 3 on Figure VIII - 5); they are provided with ample railroad sidings. The structures comprise: two warehouses, each 22,600 square feet in area and 19½ feet in height; one cold storage warehouse 22,600 square feet in area and 27¾ feet in height; and a special bonded warehouse with 131,170 square feet of floor space. The total capacity of the warehouses is reported to be 87,000 tons of merchandise.

(c) *Supply dumps.* The open storage space in the rear of the quays in the northeast part of the inner harbor totals seven and one-half acres. Ample railroad sidings are available. In the vicinity of the railway piers on the west side of the harbor there is considerable additional open storage space available.

(4) *Other landing places.* There is an open pile 150-foot pier on a sandy bathing beach, north of the harbor about 1,070 yards. The depth of water alongside the pier is reported to be a maximum of seven feet. It is reported that, if necessary, vessels could come alongside both sides of the east breakwater of the harbor. At Evksinograd, three and one-half miles east-northeast of the harbor and near the northern entrance point of Varna Bay, is a small harbor formed by a mole extending west for 250 yards. The depth alongside the mole is seven feet.

(5) *Harbor craft.* There are two tugs and a few lighters of about 200 tons each. There is also a water boat with a capacity of 25 tons. There are two dredges in the harbor, of which one is a suction dredge and the other a chain and bucket dredge. A stone quarry on the southwest side of Lake Devna has a fleet of eight or ten small barges and a tug.

(6) *Clearing facilities.*

(a) *Railroads.* The railroad station and yard are situated just north of the inner harbor. A single-track line of standard gauge enters Varna from the west, a branch line curving south and crossing the Devna Canal to serve the industrial establishments on the south side of the canal and the naval oil terminal at its seaward end. The railroad line from Varna has connections west of the port with various lines leading as follows: north to the Bulgarian-Rumanian frontier; northwest to Ruse (Ruschuk), on the Danube; west of Sofiya; and south by a circuitous route to Burgaz.

(b) *Highways.* The main roads leading from Varna are as follows: a metalled coastal road running northeast into Rumania; a main trunk road running north to Rumania; a main trunk road running west to Sofiya, with a branch running northwest to Ruse and a main road branching south to Burgaz. Another main road runs south from Varna along the coast to Burgaz. This road averages 19 feet in width, but

has an unmetalled portion nine miles long which is impassable in bad weather. The roads are all inferior as compared with standards in this country, the first-class roads having either a waterbound macadam or gravel surface.

(7) *Labor.* No data available.

(8) *Capacity.*

(a) *Annual traffic.* Varna is mainly a grain exporting port. The chief imports are coal, coke, raw cotton, textiles, hides, tanning extract, chemicals, metals and machinery, fruit and olives. In 1937, 958 vessels entered the port, discharged cargo totaling 86,830 short tons, and loaded cargo totaling 171,172 short tons.

The most important commodities exported in 1937, according to a report believed to include some shipments not handled by water, are given in Table VIII - 4.

TABLE VIII - 4  
VARNA, PRINCIPAL EXPORTS, 1937

	SHORT TONS (2,000 LBS.)
Grain.....	115,140
Wheat flour.....	2,675
Bran.....	11,400
Vetches and beans.....	36,690
Oil cake and oil seed waste.....	10,410
Cheese.....	480
Cattle.....	4,875
Poultry.....	1,785
Eggs.....	105
Charcoal.....	580
Fruit, fresh and preserved.....	3,175
Sunflower and other seed.....	2,230
Lard.....	485

(b) *Unloading.* The estimated unloading capacity of the port is 2,960 short tons per day.

(c) *Clearance.* Insufficient data available.

C. *Supplies.*

(1) *Water.* Fresh water is supplied to vessels at the quays in the northeast corner of the inner harbor (Nos. 1 to 3 on Figure VIII - 5) by a two-inch pipeline laid on the quays. The availability of water supply for vessels at the other wharves of the port is not known. There is a water boat with a capacity of 25 tons.

(2) *Oil and gasoline.* The naval oil storage tanks are on the south side of the west end of the Devna Canal. The installation consists of a large tank with a capacity of about 6,900 barrels and two smaller tanks, each with a capacity of about 1,725 barrels. New underground oil tanks were believed to be under construction in 1942 on the shore of Varna Bay just south of the above tanks. A pipeline is reported to pass under the Devna Canal to connect the naval oil tanks with the navy yard on the opposite bank. It appears also that an extension of this pipeline is laid on the south breakwater (No. 7 on Figure VIII - 5) for the use of vessels, but this is unconfirmed. No data are available concerning bunkering facilities for vessels at the port. According to information dated June, 1942, dredging was reported in progress for bringing tankers close inshore at the naval oil storage installation.

(3) *Coal.* A very small quantity of low-grade Bulgarian coal is stocked. Vessels may bunker alongside the quays in the northeast part of the harbor at a maximum rate of 300 tons per day.

(4) *Electricity.* (See Chapter VI.)

(5) *Other supplies.* No data available.

#### D. Repair facilities.

##### (1) *Dry docks.*

(a) *Location.* A small floating dry dock is moored at the eastern end of Lake Devna, to the northward of Devna Canal. The dry dock was built in 1909 and is owned by the "Koralovag" Company, a local concern engaged in the construction of ships, locomotives and trucks.

(b) *Size.* The principal dimensions are shown in Table VIII - 5.

TABLE VIII - 5  
VARNA, FLOATING DRYDOCK DIMENSIONS

	FEET
Extreme length.....	270
Length on bottom.....	270
Width at coping.....	69
Width on bottom.....	66
Maximum depth on keel blocks.....	15¼

(c) *Capacity.* The dry dock has a lifting power of 2,200 tons.

##### (2) *Marine railways.*

(a) *Location.* At the navy yard in the southwest corner of the inner harbor are seven small broadside marine railways.

(b) *Capacity.* One marine railway has a lifting power of 200 tons, and the other six each have a lifting power of 100 tons.

(3) *Marine repair plants.* Minor repair facilities are available at the navy yard. The Bulgarian Engineering Company for the Construction of Ships, Locomotives and Trucks, known as the "Koralovag," has a yard situated on the east side of Lake Devna, adjacent on the north to Devna Canal. The yard has facilities for repair work and the construction of small vessels. A navy building yard with workshops has been established on the south side of Lake Devna. This yard, under German control, is reported to be constructing self-propelled landing barges for troops. No data are available.

#### E. Vulnerability.

Vulnerable objects at Varna include: the harbor installations and railway yards; the naval yard and oil storage depot; the "Koralovag" shipyard; the highway and railroad bridge across the Devna Canal; and bridges for the main railroad line running west from Varna along the north side of Lake Devna. These targets are all vulnerable to bombardment from air and sea. (Illustration VIII - 2.)

#### F. Recent changes.

Various harbor improvement works are believed to have been recently carried out, but as previously stated, no accurate information is available. These works include quay construction on the west and southwest sides of the inner harbor; the construction of Dock No. 2 on the north bank of the Devna Canal; and dredging in Devna Canal, in Docks Nos. 1 and 2, in the northeast part of Lake Devna, and in the vicinity of the naval oil storage depot. (Since Illustration VIII - 2.)

## 82. Minor Ports—Tsarevo

#### A. Harbor.

Tsarevo (42° 10' N, 27° 54' E), formerly called Vassiliko, is on the west coast of the Black Sea, 91 statute miles northwest of the Bosphorus. The port serves the southeastern part of Bulgaria, and the harbor works were constructed during the period 1928 to 1935. Tsarevo has a small natural harbor about 900 yards in diameter, the northern side of which is protected further by a rubble-mound breakwater.

The breakwater extends from shore in a southeast direction for 676 feet, continuing southerly for 230 feet and reaching a depth of 37¼ feet at its seaward end. There are depths of 32 feet in the center of the harbor, shoaling gradually toward the sides. The village is on the southern side of the harbor.

There are depths of 11 to 15 fathoms up to the harbor entrance, which is about 600 yards wide and has depths of six fathoms. In 1941 an occulting red light, 36 feet above the water and visible four miles, shown from a stone tower on a rock at the southern entrance point, and a flashing white light, 38 feet above the water, shown from a tower at the head of the breakwater to mark the northern entrance point.

#### B. Landing facilities.

On the north side of the harbor, adjacent on the west to the breakwater, are two quays of concrete block construction. One quay is 246 feet long and has a foundation depth of 10½ feet below sea level. The second quay is a continuation of the first, at an angle of 146°. It has a length of 312 feet, and a foundation depth of 14 feet below sea level. The depths of the berths alongside the quays are believed to be approximately the depths of the quay wall foundations. Both quays have a mass concrete superstructure, the top of which is five feet above sea level.

The quays are probably lighted, as an electric power plant has been built. Additional construction includes a port administration building and warehouses, concerning which no details are available.

#### C. Capacity.

The clearance capacity of the port is reportedly poor. A concession was granted by the State about 1926 to exploit large forests beginning about ten miles inland and the licensee had the obligation of building a railroad with a gauge of 76 centimeters (1 ft. 7¼ ins.) from Varna to a point about 31 miles inland. This concession was subsequently forfeited and it is not known whether the railroad was built. No data are available on the commerce of the port but it is believed to be of small importance.

The roads leading from the port are poor and not serviceable for heavy traffic. A local road runs southwest to the Turkish frontier and another local road runs northwest along the coast to Burgaz. The unloading capacity of the port is estimated at 200 short tons per day. The number and capacity of the lighters available are not known.

#### D. Supplies and repairs.

No data available.

**E. Vulnerability.**

The vulnerable objects in the port are limited to the harbor works and installations, including the warehouses. These are vulnerable to bombardment from sea and air.

**F. Local problems.**

No data available.

**82. Minor Ports (Continued)—Akhtopol****A. Harbor.**

Akhtopol (42° 06' N, 27° 59' E) (Agathopoli) is on the west coast of the Black Sea, 85 statute miles northwest of the Bosphorus. The harbor is a small cove with a breakwater extending in a northerly direction. It affords shelter to vessels with a draft of not more than 16 feet. There are depths for anchorage of about 24 feet, over a sandy bottom, but the greater part of the cove has depths of only about 12 feet. The shore of the cove is shingle.

The entrance to the cove, a little more than 100 yards wide, is between a reef of rocks which borders the northern and southern entrance points; most of the rocks are above water and visible. The town is at the northern entrance point. The maximum depth in the entrance channel is about 27 feet. On the southern entrance point in 1941, an occulting white light, 39 feet above the water and visible five miles, shown from a masonry tower.

**B. Landing facilities.**

The only wharf in the harbor is a quay 300 feet long. The depth of water alongside is not known.

**C. Capacity.**

The unloading capacity of the port is roughly estimated at 80 to 100 short tons per day. The port has poor clearance facilities. There is no railroad serving Akhtopol, and the only road leading from the town is a local road running northwest along the coast to Tsarevo, about five and three-quarter miles distant, and continuing along the coast to Burgaz.

**D. Supplies and repairs.**

No data available.

**E. Vulnerability.**

The only vulnerable points are the breakwater and quay. These are vulnerable to bombardment by sea and air.

**F. Local problems.**

No data available.

**82. Minor Ports (Concluded)—Nesebr****A. Harbor.**

Nesebr (42° 39' N, 27° 44' E), also called Messemvria, is on the west coast of the Black Sea, 122 statute miles northwest of the Bosphorus. The town is on a rocky peninsula which is connected to the mainland by a narrow isthmus of sand, sometimes covered by the sea. The peninsula is nearly surrounded by a reef, which extends about one-half mile eastward from it and is about one-half mile in extent north and south. (See Illustration III - 71.)

There are no harbor protective works. On the south side of the peninsula is a bight about 2,200 yards wide at its entrance and indenting the coast about 800 yards, forming a natural harbor sheltered from northerly and westerly winds, but open from south to east. Vessels anchor in this bight 800 yards offshore, in depths of five to eight fathoms, over a bottom of sand and shells. There is anchorage also to the north of the isthmus, in depths of about seven fathoms, but this anchorage is exposed to the squalls which blow violently from the heights to the northward during northerly winds. There was a masonry tower, in 1941, on the southern side of the town, from which shown a flashing light with white and red sectors, 28 feet above the water and visible six miles. The red sector shown from 151° to 216°.

**B. Landing facilities.**

There is a small pier, believed to be under 150 feet in length, which extends in a south-southwest direction from the southern side of the peninsula. A second pier was reported in June, 1943, to be under construction. Details of the piers are not available. The depths alongside are believed not to exceed 16 feet.

**C. Capacity.**

The capacity of the port is roughly estimated to be about 80 to 100 short tons per day. The clearance facilities of the port are reported to be poor. There is no railroad, and the only known road is a local road running along the coast northward to Varna and southward to Burgaz.

**D. Supplies and repairs.**

No data available.

**E. Vulnerability.**

The only vulnerable objects in the port are the two piers on the south side of the town. These are vulnerable to bombardment by sea and by air.

**F. Local problems.**

No data available.